the architect was justly held responsible. It was so also in Greece, where, if an architect's estimates were exceeded in the execution of the works, his own fortune was liable for the difference.

INSTITUTION OF CIVIL ENGINEERS.

IRON DOCK-GATES.

Sir John Rennie, president, in the chair. The first meeting of the session was held on Tuesday evening, January 12th, when a paper by Mr. Shears was read, descriptive of the iron dock gates constructed by Messrs. Rennie for the Russian Government, and erected at Sevastopol, on the Black Sea.

Sevastopol is very peculiarly situated amidst rocky ground, rising so abruptly from the shore, that there was not space for the buildings necessary for a dockyard. On account of the depth of water close in shore, and other natural advantages, the emperor determined to make it the site of an extensive establishment, and as there is not any rise of tide in the Black Sea, and the construction of cofferdams would have been very expensive and difficult, in such a rocky position, it was decided to build three locks, each having a rise of ten feet, and at this level of thirty feet above the sea to place a main dock, with lateral docks, into which vessels of war could be introduced, and the gates being closed, the water could be discharged by subterranean conduits to the sea, and the vessel being left dry, could be examined and repaired even beneath the keel. A stream was conducted from a distance of twelve miles, to supply the locks, and to keep the docks full; this, however, has been found insufficient, and a pumping engine has since been erected by Messrs. Maudslay and Field, for assisting. The original intention was, to have made the gates for the docks of timber, but on account of the ravages of a worm, which it appears does not, as in the case of the *teredo navalis*, or the *terebrans*, confine itself to the salt water, it was resolved to make them with cast-iron frames covered with wrought-iron plates.

There are nine pair of gates, whose openings vary from 64 feet in width, and 34 feet 4 inches in height, for ships of 120 guns, to 46 feet 7 inches in width, and 21 feet in height, for frigates.

The manifestation of such masses of metal as composed these gates demanded peculiar machines; accordingly, Messrs. Rennie fitted up a building expressly with machines constructed by Mr. Whitworth, by which all the bearing surfaces could be planed and the holes bored in the ribs, and all the other parts, whether their surfaces were curved or plain. The planing was effected by tools which travelled over the surfaces backward and forward, cutting each way; the piece of metal being either held in blocks, if the surface was plain, or turned on centres, if the surface was curved. The drilling was performed by machines so fixed, that the pieces could be brought beneath or against the drills in the required direction, and guided so as to insure perfect uniformity and accordance between them. Travelling cranes were so arranged as to take the largest pieces from the wharf and place them in the various machines, by the agency of a very few men, notwithstanding their formidable dimensions; the heelposts in some cases being upwards of 34 feet long. Each endless screw, for giving progressive motion to the cutting tools, was 45 feet long. Some idea may be formed of the manual labour avoided by the machines, when it is stated, that the surface planed or turned in the nine pairs of gates equals 717,464 square inches; and in some cases a thickness of three quarters of an inch was cut off. The surface in the drilled bolt holes equals 120,000 square inches.

The paper gave all the details of the construction of the gates, and the machines for making them, and was illustrated by a series of detailed drawings.

An interesting discussion followed, chiefly on the peculiarity of the site selected for the docks, and the supposed ravages of the worm in fresh water, as it was of unusual occurrence.

It seemed to be the opinion, that temperature of climate influenced the ravages of these insects. The meeting was held in the library, as the new theatre was yet too damp to be used with safety. It was announced the meetings would be held there in February.

GREAT BURSTEAD CHURCH, ESSEX.

Although Great Burstead is but a village, it gives name to the parish, including Billericay, a market town, from which it is situated about one mile. The church is an interesting one, and rather larger than the parish churches in the neighbourhood. It consists of western tower, with spire; nave and south aisle; chancel and south chapel; and north and south timber porches.

The south aisle and chapel are under a continuous roof; but the separation of nave from chancel is marked externally in the usual manner: the whole being roofed with tiles.

One of the best features of the church is the stone, embattled, perpendicular tower. It is divided into three stages by string courses, which have almost crumbled away. In the highest stage are four windows, all alike; viz., of two lights, cinque-foiled, square-headed, with dripstones. The middle stage contains, on the west side, a two-light, pointed, perpendicular window, with tracery (internally well splayed); and on the north side a cinque-foiled window.

On each side of the tower are about forty very small square holes, arranged in two lines. It is supported by buttresses, placed at right angles (at the north and south-west corners); these are of two stages, with plain slopes, and commence a little less than half way up the tower. On the western side is a pointed doorway, with bold mouldings continued down the jambs. The spire is apparently of shingles; it is rather high, but the base of it is not large enough for the tower.

The nave has on the north side (beginning at the west end), a three-light square-headed Tudor window, with dripstone; a small lancet, on the east side of, and close to, the north porch (the internal splaying of this window is very wide); and a three-light, early perpendicular window, with tracery and dripstone,—a very good window. In the south side of the south aisle are two two-light, pointed, early perpendicular windows, with tracery, but without dripstones; one on each side of the porch. At the west end of this aisle is a three-light Tudor window, under a four-centred arch, with dripstone.

The porches are opposite each other, and are placed in the second bay from the west end. They are fine, with good, high pitched, timber roofs; that on the south has the best roof; and that on the north a fine barge board. The latter is foliated, and on each side, between the eaves and the featherings, or cusps, a line may be traced, with a representation of crockets upon it. It is not cut deeply, and cannot be seen at any distance. The roof of this porch has but two principals, each being composed of a tie-beam with pierced spandrils, wall-plates, and king-post with struts. The north door is four-centered perpendicular, under a square dripstone, with notch heads; having angels in the spandrils, bearing scrolls. On the right hand of this door is a very perfect "benatura." It is recessed, square-headed, with dripstone, and were it in the interior, might easily be mistaken for a piscina.

The south porch has at the entrance a piece of framework, consisting of boarding up to the eaves (a four-centered doorway being cut through it); and from this springs a king-post, with a collar, supporting the gable end of the roof. The roof is simply a row of principal rafters on either side, with a collar some distance below the ridge piece, connecting each with that opposite; the beams are thick, and the effect very good.

The south doorway is plain pointed; and on the door is a good escutcheon: it is circular and pierced.

The chancel contains, on the north, one three-light window, under a four-centred arch, with dripstone; and a three-light square-headed Tudor window, without foliations, high up in the wall, and very short.

The east end is bricked up, and plastered over; and where the east window stood (perhaps still stands), a monumental tablet has been stuck up.

The chapel has at the east end a three-light window, under a four-centered arch, exactly similar to that in the north wall of the chancel, and that at the west end of the south aisle: and the two windows on the south are of the same design.

Interior.—The nave and chancel are separated from the south aisle and chapel by a row of arches resting on octagonal pillars, with moulded capitals and bases.

The pavement of the church has been lowered and made level; the ground exteriorly being much higher; there are no chancel or altar steps, and the pillars are uncovered below the bases, to the depth of about two feet.

Five principals of the nave and chancel roofs remain, each consisting of horizontal tie-beam, with king post and four struts or braces, two to support the ridge piece, and two the rafters.

Through the pillar against which the chancel screen must have rested, a small doorway is cut (consequently this pillar is much thicker than the others), which opens into the south aisle; probably it was formerly connected with the rood loft. In the south-east corner of the chancel is a perpendicular piscina; it closely resembles the benatura in the north porch, with the exception that it has no dripstone.

Here has been erected a large altar-piece, of which it cannot be said (to use the words of a last century topographical writer) "that the style is in accordance with the edifice in which it is placed."*

The south chapel has a groined oak ceiling, with bosses. In the south aisle are several original low open seats, the ends having carved panels; the design is good, and they are all alike. In the windows of this aisle are some fragments of stained glass; one contains a coat of arms. At the west end of the nave is a large gallery, and under it is the "old oak chest," covered with bands of iron, and secured by three padlocks. Close to this stands the font; it is octagonal, with moulded stem and base. There are no monuments of interest.

HISTORICAL NOTICE.

In the reign of Edward the Confessor, the lordship of Great Burstead (then known as Burghesfedam), consisted of one manor and ten hides, and belonged to Ingar, a Saxon theyn.

William the Conqueror having confiscated it, gave it to his brother, Odo, Bishop of Bayeux. The latter was deprived of his immense possessions, for his participation in a plot against Rufus in 1088, and this manor remained in the crown for many years.

The first mention of it after this event is in 1263. "The Abbot of Stratford held of the donor of the Mareschall," Mareschalls, Earls of Pembroke, "half a fee in Bordestedd."—*Inq.* 47, H. 3.

Thomas, Earl Stafford, who died in 1393, had half a fee in Great Burstead, which the same abbot held.—*Inq.* 16, Ric. 2.

And Edmund Stafford (died 1403), and Humphrey Stafford, Duke of Buckingham (died 1459), possessed each half a fee.

John Mowbray, in 1433, possessed two fees and a half. These show the lords paramount of the lands in this parish.

It contains three manors; viz. Great Burstead, otherwise known as Burstead Grange, West House, and Blunt's Walls. The first belonged to the Cistercian abbey of Stratford Langthorne, which possessed most of the lands in this parish; but only some of the donors of them are known.

In 1262, they held a fee of Earl Mareschall; donor unknown. Henry III., in 1253, and Edward I., in 1285, granted the abbot and monks a market and fair in Great Burstead. Their greatest benefactor was William Langdich, who in 1358, granted them one messuage and 345 acres of arable and pasture land, and 44s. rent in Great Burstead; held of the Earl of Gloucester. In 1388, John Henry, and Rohesia, his wife, gave them 60 acres of arable land, and 1 acre of wood in this parish. In 1476, Edward IV. granted a market and two fairs in Billericay.

In 1515, this manor was let for thirty years for 31*l.* 7*s.* 4*d.* It was granted by Henry VIII., in 1539, to Sir Rd. Riche; and remained in this family till 1600, when Sir Edwin Riche sold it to Sir John Petre, knt., in whose family it still remains.

The manor of West House belonged to the same abbey, and at the dissolution it was granted to the same Sir R. Riche. He sold it; and, passing through various hands, it came, during the last century, into the possession of Guy's Hospital.

* This is stated of a "large and commodious pew," erected by one of the Bishops of Hereford in the choir of his cathedral, during the last century.

To learn how to use OCR and PDF Compression visit our website